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Proceedings of the Maritime Provinces Regional Advisory Process on 4VWX Herring Stocks

22 March 2006
Rodd Grand Hotel
Yarmouth, NS

and

11-12 April 2006
Bedford Institute of Oceanography
Dartmouth, N.S.

Wayne Stobo
Meeting Chairperson

Compte rendu du la réunion du Processus consultatif régional des provinces Maritimes sur les stocks de hareng de 4VWX

Le 22 mars 2006
Rodd Grand Hôtel
Yarmouth, (N.-É.)

et

Du 11 au 12 avril 2006
Institute océanographique de Bedford
Dartmouth, (N.-É.)

Wayne Stobo
Président de réunion

Fisheries and Oceans Canada / Pêches et Océans Canada
Bedford Institute of Oceanography / Institute océanographique de Bedford
Dartmouth, Nova Scotia / Dartmouth, N.-É.
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June 2006

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Foreword

The purpose of these proceedings is to archive the activities and discussions of the meeting, including research recommendations, uncertainties, and to provide a place to formally archive official minority opinions. As such, interpretations and opinions presented in this report may be factually incorrect or mis-leading, but are included to record as faithfully as possible what transpired at the meeting. No statements are to be taken as reflecting the consensus of the meeting unless they are clearly identified as such. Moreover, additional information and further review may result in a change of decision where tentative agreement had been reached.

Avant-propos

Le présent compte rendu fait état des activités et des discussions qui ont eu lieu à la réunion, notamment en ce qui concerne les recommandations de recherche et les incertitudes; il sert aussi à consigner en bonne et due forme les opinions minoritaires officielles. Les interprétations et opinions qui y sont présentées peuvent être incorrectes sur le plan des faits ou trompeuses, mais elles sont intégrées au document pour que celui-ci reflète le plus fidèlement possible ce qui s'est dit à la réunion. Aucune déciaration ne doit être considérée comme une expression du consensus des participants, sauf s'il est clairement indiqué qu'elle l'est effectivement. En outre, des renseignements supplémentaires et un plus ample examen peuvent avoir pour effet de modifier une décision qui avait fait l'objet d'un accord préliminaire.

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SUMMARY

The 2006 Maritimes Regional Advisory Process (RAP) for herring stocks in NAFO divisions 4VWX in the Bay of Fundy/southwest Nova Scotia and on the Scotian Shelf, including coastal areas, was split into two sessions: RAP Data Input Meeting (March 22, 2006, Yarmouth) and RAP Scientific Peer Review Meeting (April 11-12, 2006, Dartmouth). The meetings were attended by a diverse assembly of representatives from government, the fishing industry, and the public. The herring assessment team from the St. Andrews Biological Station, and the Herring Science Council tabled several working papers. The Science Advisory Report was drafted and reviewed.

SOMMAIRE

Le processus consultatif régional (PCR) des provinces Maritimes de 2006 sur les stocks de hareng des divisions 4VWX de l'OPANO, visant la baie de Fundy et le sud-ouest de la Nouvelle-Écosse ainsi que le plateau néo-écossais et les eaux côtières, s'est déroulé en deux phases, soit une réunion sur les données d'entrée (le 22 mars 2006 à Yarmouth) et une réunion scientifique d'examen par les pairs (les 11 et 12 avril 2006 à Dartmouth). Ont participé à ces réunions divers représentants du gouvernement, de l'industrie de la pêche et du public. L'équipe d'évaluation du hareng de la Station biologique de St. Andrews et le Conseil scientifique du hareng y ont présenté plusieurs documents de travail. Une ébauche d'Avis scientifique a été élaborée et examinée.

INTRODUCTION

The 2006 Maritimes Regional Advisory Process (RAP) for herring stocks in NAFO divisions 4VWX in the Bay of Fundy/southwest Nova Scotia and on the Scotian Shelf, including coastal areas, was split into two sessions: RAP Data Input Meeting (March 22, 2006, Yarmouth) and RAP Scientific Peer Review (April 11-12, 2006, Dartmouth).

The intention of having two meetings was to (1) strengthen the Data Input review aspect of the RAP process, and (2) ensure that the RAP Scientific Peer Review Meeting concentrated on the scientific peer review and interpretation of the information. The Data Input review was about 3 weeks before the Scientific Peer review: late enough to allow time to have the data inputs ready, but early enough so there was sufficient time before the Peer Review meeting to incorporate the feedback from the Data Input Meeting and to prepare the complete assessment document including the Virtual Population Analysis (VPA). Therefore, the VPA was not be available at the Data Input Meeting. The final goal of the two RAP sessions was to develop stock status conclusions and advice, and complete the Science Advisory Report (SAR).

Presentation and discussion of data inputs to the assessments occurred at the RAP Data Input Meeting (March 22, 2006, Yarmouth). Presentation and discussion of the outcome from this first meeting, the subsequent analyses conducted, and the formulation of the "Conclusions and Advice" portion of the Science Advisory Report occurred during the 2-day RAP Scientific Peer Review meeting (April 11-12, 2006, BIO Auditorium, Dartmouth, NS).

The lists of participants (Appendices 1 and 2), formal invitation (Appendix 3), agendas (Appendices 4 and 5), remit (Appendix 6), and list of working papers (Appendix 7) appear in the appendices.

[The Proceedings were subsequently adopted by correspondence.]

RAP DATA INPUT MEETING OF 4VWX HERRING

The meeting commenced at 9 a.m., March 22, with the Dr. Wayne Stobo, the Chairman, welcoming participants. After introductions, a sign-up sheet was distributed (see Appendix 1 for the list of participants). The Chairman reviewed the Meeting Agenda (Appendix 4), and the Remit (Appendix 6) and listed the working papers that were to be reviewed at the meeting. Three papers were provided for information purposes and were not discussed at the meeting. These papers included the working paper 2006/06 (2005 4WX herring fishery – report of fleet activity), and two review papers (2006 Summary of the Weir Herring Tagging Project and Investigation of the Seasonal Distribution and Abundance of Adult and Juvenile Atlantic Herring in the Fundy Isles Region using an Acoustic System Mounted on a Commercial Herring Carrier). The presentation of the remaining three working papers then began. The rapporteur was K. Clark.

Southwest Nova / Bay of Fundy Spawning Component

Working Paper: Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin and R.L. Stephenson. 2006. 2006 Evaluation of 4VWX Herring. RAP Working Paper 2006/05.

Summary of Presentation:

In 2005, with a reduced catch limit of 50,000t, the landings in the southwest Nova Scotia/Bay of Fundy spawning component were 48,900t; this was 29,100t lower than the previous year. The catch at age continued to show an absence of older fish in the catch, but there was evidence of the 2001 and 2002 year-classes (ages 3 and 4 in 2005) progressing through the fishery.

Comments and Questions on the Working Paper:

There was considerable discussion regarding the Virtual Population Analysis (VPA), which was not presented at this Data Input Meeting. The VPA requires the data which was being reviewed, discussed and finalized at this meeting and will be presented as part of the Scientific Peer Review RAP meeting on April 11 and 12, 2006. Industry representatives requested that the working paper containing the VPA be distributed well in advance of the April meeting. It was agreed that the VPA would be distributed as soon as possible with the understanding that there might be changes made in the final internal review process prior to the RAP meeting. The process followed by the Lobster Regional Assessment Process was outlined and it was suggested that this might be considered for herring. As part of the Lobster RAP an industry group works on the assessment process with Science throughout the year. It was felt that this promoted a cooperative, rather than an adversarial, approach.

Recommendation: Industry representatives should contact the RAP office to discuss the schedule so that there is sufficient time between meetings to review the documentation.

Comment: The "ideal" age structure which was presented in previous assessments was discussed. Industry representatives felt that the "ideal" structure was not appropriate since significant numbers of older fish are not observed in areas such as Georges Bank and the Offshore Scotian Shelf where there is less fishing pressure.

Response: The current age structure for the SW Nova / Bay of Fundy spawning component still shows a lack of older fish. The removal of the large, old, most fecund fish leaves the fishery dependent on a small number of year classes which reduces the population resiliency. Currently the fishery depends on fish of two ages but the progression of the 2001 and 2002 year classes to ages 3 and 4 in the 2005 catch at age, is a positive sign.

Recommendation: Review the age structure of a lightly exploited area like Georges Bank and compare it to the "ideal" age structure to determine how appropriate this age structure might be.

Comment: The 1990 peak in age 7+ fish in Figure 29 and Table 4 of the working paper was discussed. Concern was expressed that this peak might be a result of the purse seiners catching fish in the Little Hope area, an area that is no longer open to them. If this were true, then it might create a false impression about the numbers of age 5+ and 7+ fish in the fishery at that time.

Response: It was pointed out that the data from the Little Hope area is labelled "Liverpool" in Table 4 and is considered non-stock. However, the 1994 assessment will be checked to determine if the catches from Little Hope were included in the catch at age. The Western Hole fishery was raised as another one that might have caused a peak in older ages in the early 1990s, but it was not included in the catch at age.

Recommendation: Check the 1994 assessment to determine whether purse seine catches from the Little Hope area were included in the catch at age.

The method by which the sampling and catch at age are weighted by the fishery was explained.

Problems Encountered in the Analysis of Acoustic Data Collected in 2005 (no working paper)

Summary of Presentation:

Prior to the presentation of working paper 2006/04, Gary Melvin illustrated some of the problems encountered in analysing the 2005 acoustic data. In 2005 both the raw and the edited data files were made available to DFO by the Herring Science Council (HSC) which allowed the identification of some editing problems. Background noise and interference in the acoustic files made it difficult to clearly distinguish the fish. The background noise in the files collected by one vessel was so great that the files could not be edited and the data had to be discarded.

Recommendation: Boats with recording equipment should be run at different speeds with the acoustic systems turned on at the start of the fishing season to examine the interference patterns and to determine the best speed at which to make acoustic recordings. Noise and interference patterns should be examined in season, by periodically checking the raw data files.

Comments and Questions on the Presentation:

Despite the problems encountered in 2005, Gary felt that the results of the acoustic analysis for individual surveys were valid. All the acoustic files had to be examined again, and this took a considerable amount of extra time.

Question: Industry representatives asked Allen Clay of FEMTO Electronics if a monitor would allow the vessel captains to view the echogram that they record during a survey to see if there are noise problems and if the sounder is functioning.

Response: Yes, a monitor would allow this and if problems are identified at this level, they could be sorted.

Recommendation: All vessels with recording equipment should have monitors and the Herring Science Council, Science staff and the vessel captains should get together in the spring to figure out noise problems and to let the captains know what is necessary for a good acoustic recording.

Working Paper: Power, M.J., G.D. Melvin, F.J. Fife, D. Knox and L. M. Annis. 2006. Summary of the 2005 herring acoustic surveys in NAFO divisions 4VWX. RAP Working Paper 2006/04.

Summary of Presentation:

Automated acoustic recording systems deployed on commercial fishing vessels have been used since 1997 to document the distribution and relative abundance of Atlantic herring in NAFO Division 4VWX from industry vessel surveys and fishing excursions. In 2005 regularly scheduled surveys, at approximately 2-week intervals, were conducted on the main spawning components and the spawning stock biomass for each component was estimated by summing these results. Three structured surveys were conducted in Scots Bay, one on Trinity Ledge and three on German Bank following established protocol. This provided good coverage of these spawning areas consistent with previous years. Additional data from fishing nights in Scots Bay and German Bank were examined. Biomass estimates for Scots Bay, Trinity Ledge and German Bank were approximately 16,800t, 5,100t, and 211,000t for an estimated total SSB of 233,200t in the traditional survey areas, which is a substantial decrease from previous years.

Biomass estimates from surveys of the coastal Nova Scotia spawning components for the Little Hope/Port Mouton and Eastern Shore areas were also examined and showed increases from the previous year. A survey with an acoustic recorder was completed for the first time in the Glace Bay area (previous estimates were based on mapping surveys). There was again no acoustic survey effort in the Bras d'Or lakes. For the offshore Scotian Shelf there were no large aggregations of herring observed and no acoustic surveys were conducted.

Comments and Questions on the Working Paper:

An explanation of the integration factor was provided by Allen Clay of FEMTO Electronics. The calibration process has changed over time, and the integration factor was introduced to provide a more accurate estimation. It is possible to re-analyse the older data collected before the integration factor was used. Science intends to recalculate a survey from around 1999 to determine how large a difference the inclusion of the integration factor might make.

It is expected to be between 5 and 10%, but if it is a significant difference then all surveys will be re-examined. This will require considerable time and manpower.

Recommendation: Acoustic survey data collected prior to the introduction of the integration factor should be reanalysed.

The acoustic survey protocol and the methods used for incorporating schools of herring outside the survey lines were discussed. This methodology will be studied further at the 4VWX Framework Assessment which is currently scheduled for the fall of 2006.

Comment: There was concern expressed by industry that the Scots Bay surveys were not representative of the quantity of fish present in the Bay. They felt that the first wave of fish occurred before the first survey in 2005. Evidence presented to corroborate this conclusion included the large number of spent fish in the first survey and anecdotal reports from Advocate Bay lobster fishers who reported more spawn on their gear than usual earlier in July. It was also pointed out that there was a gap of three weeks, rather than the usual two, between two of the surveys due to scheduling difficulties and that the final survey was conducted under adverse weather conditions. It was suggested that the comments regarding the Scots Bay surveys should be included in the assessment document and that perhaps an asterix should be placed on the estimate to reflect these problems.

Recommendation: Comments on the problems with timing and survey coverage on Scots Bay should be included in the assessment document.

Comment: The use of deck sheets by vessels without acoustic gear was discussed. In the past, when no acoustic gear was available, deck sheets were used to calculate a biomass estimate.

Response: They are still extremely important since they are used to show the extent of herring schools for the biomass calculation. The survey on German Bank on October 4th was discussed as a case in which a vessel without recording gear recorded a large body of fish on their deck sheet which could not be included in the final estimate.

Comment: In the past the acoustic estimates have been referred to as a minimum observed SSB, and concern was expressed by industry representatives that now that the numbers are low, the acoustic estimates are being considered absolute estimates of abundance.

Comment: The problem of editing acoustic files of fish surveyed close to the bottom was raised.

Response: It is hard to distinguish between fish and the bottom when they are close. Currently the technology is not sophisticated enough to detect the differences.

Comment: The issue of the standard errors for the survey estimates was raised.

Response: The standard errors for individual surveys were in the same general range as in recent years, but there was a higher SE for all surveys combined. This reflected the distribution of the fish since there were more intensely focused schools, combined with many areas without fish.

Working Paper: Clark, K.J. 2006. An Examination of Turnover Rate of Herring on the Spawning Grounds of Scots Bay and German Bank using Tagging Data. RAP Working Paper 2006/03.

Summary of Presentation:

In response to a recommendation from the 2005 RAP, tags were applied to herring on the spawning grounds of Scots Bay and German Bank. In Scots Bay 5,047 herring were tagged on four tagging trips spaced at weekly intervals and on German Bank 8,580 herring were tagged on five trips at as close to weekly intervals as possible. When tags returned in the initial two days after tagging were discounted, a tag return rate of 3% was reported for Scots Bay and 0.5% for German Bank. The results from the tag returns indicated that some tagged herring remained on the spawning grounds for at least 3 weeks after tagging, and in some cases, up to five to six weeks after tagging. As a result, acoustic surveys that were spaced at 2 week intervals were surveying some of the same fish twice.

There were sufficient tag returns from Scots Bay to compare the proportion of herring that remained on the spawning grounds over time. The tag returns from each tagging event in Scots Bay were adjusted by landings and then standardized and compared. Based on this analysis it was concluded that the residency time of herring on the spawning grounds of Scots Bay could be quantified, but it appeared to be extremely variable, as evidenced by the large standard errors.

Sixty-three of the 151 tag returns from the Scots Bay tagging events came from outside the Bay. Of these, 63% were from the New Brunswick weirs, some within the first few days after tagging. Length frequency and maturity data from the weirs showed that there were fish in post-spawning condition and of the same size as those in Scots Bay. In addition 51 fish tagged in the New Brunswick weirs as part of a separate experiment have been returned from the Scots Bay spawning grounds. These results indicated a possible affinity between the fish tagged in Scots Bay and the New Brunswick weirs.

Comments and Questions on the Working Paper:

Comment: There was discussion of the low tag return rate from German Bank. Industry representatives suggested that the fish may leave immediately after spawning, hence the low return rate, rather than reduced reporting of tags recovered.

Response: Tag returns would be expected from other areas and this has not been the case to date and there are good tag returns from two plants that process German Bank fish. Although the lack of tag returns from some plants is a problem, it is likely not the only reason for low tag returns.

The difference between Scots and German Bank spawning grounds was discussed as a possible reason for differences in tag returns. An issue not addressed by the current study is that fish continually arrive on the spawning grounds.

Comment: It was suggested that some fish might be so traumatised by tagging, that they stop spawning and stay on the spawning grounds to recover, lengthening the residency time.

Response: Currently there is no evidence to support this.

Comment: Tags returns from the spawning grounds several weeks after tagging were not considered to be a significant problem by some industry representatives and

concern was expressed that the timing between surveys would now be lengthened.

Response: The Chair reminded the participants that this would be an issue addressed at a framework assessment, not during the current assessment process.

It was suggested that this experiment should be continued since one year's data is not sufficient to make firm conclusions. Repeating the experiment would address some of the questions raised at this meeting and would show if there was consistency in the results.

Recommendation: A repeat of the tagging experiment on the spawning grounds should be considered for 2006.

The Use of Tagging Data to Re-examine Acoustic Estimates (no working paper)

Summary of Presentation:

A brief presentation was given by Gary Melvin showing how the information collected by the tagging study might be used to re-examine the acoustic estimates from previous years from the spawning grounds of Scots Bay.

Comments and Questions on the Presentation:

This paper was presented for information only, and as a preview of the type of data that might be considered at the framework. It was felt that presenting this type of information well in advance of the framework was a positive approach but there was concern expressed that there not be pressure to make the data conform to the VPA.

Comment: Concern was expressed about the estimate because some of the fish surveyed and tagged were not in spawning condition.

Response: The fish that were tagged on the spawning grounds were not all in spawning condition, but these would be the fish that were surveyed acoustically, whether or not they were spawning and thus would have been included in the biomass estimate from which the allowable catch was determined. Since only the tags, and not the actual tagged fish, are returned we are unable to determine the maturity stage of the fish upon recapture.

Coastal Spawning Component

Working Paper: Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2006. 2006 Evaluation of 4VWX Herring. RAP Working Paper 2006/05.

Summary of Presentation:

Recorded landings of 2,239t from the Little Hope / Port Mouton area were up from 2004 but below the 5 year average. The catch at age was dominated by the 1999 and 2000 year-classes. The recorded landings of 3,446t from the Eastern Shore were below the landings from 2004, but were still above the 5 year average. The catch at age was dominated by the 1998, 1999 and 2000 year-classes. The landings from the Glace Bay fishery were 626t, well below landings from recent years and the catch at age was dominated by the 1998 and 1999 year-classes. The Bras d'Or Lakes fishery remained closed in 2005.

Comments and Questions on the Presentation:

The acoustic survey data for October 28/29 from the Eastern Shore needs to be re-examined in order to determine whether it should be included in the calculation of the surveyed biomass. Information from September 20 might also be included.

Action Item: The data collected on Oct 28/29 and Sept 20 from the Eastern Shore will be re-examined and, if appropriate, included in the calculation of the surveyed biomass.

There was a discussion of the mesh sizes used in the inshore gillnet fisheries. It was proposed that a larger mesh panel be included in the multi-panel net used by the Eastern Shore Fishermen's Association (ESFPA).

The ESFPA members also indicated that they can only survey fish once at a specific location and they never get another survey in the exact same location. The suggestion was made that if they survey five different places, even within ten to fourteen days, then the five different biomass estimates should be added together.

Offshore Banks Spawning Component

Working Paper: Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2006. 2006 Evaluation of 4VWX Herring. RAP Working Paper 2006/05.

Summary of Presentation:

Landings of 5,263 from the 2005 offshore Scotian Shelf banks were slightly above the landings in 2004. The 2005 fishery was dominated by catches of age 4 and 5 fish. The bottom trawl research survey catch was down in 2005 from the very high catch observed in 2004. Herring were widely distributed on banks west of Sable Island.

Questions and Comments on the Working Paper:

Comment: The number of herring caught per standard tow in the summer bottom trawl survey decreased in 2005 (Figure 52 in the working paper). Was the same vessel used for the survey in recent years?

Response: The Teleost was the only vessel available in 2004 when there was a peak in the number of herring caught. The regular survey vessel, the Needler, and the Teleost conducted comparative fishing on the offshore banks in the summer of 2005 and the catch results for herring were fairly comparable.

Comment: There could be several reasons for the changes in the number of herring caught in the summer bottom trawl survey. Environmental changes were suggested as *one possible cause.*

Response: It would be beneficial to examine environmental changes but this is complex and requires both personnel and funding. Raw temperature data are available for analyses.

Comment: Other factors responsible for a possible change in the distribution of herring on the Offshore Banks were discussed. The observation was made that herring

have stayed close to the bottom for at least the last four or five years, making them difficult to catch with a purse seine but more available to a bottom trawl.

Comment: There was the suggestion that with the increase in the seal population, herring are staying close to the bottom to avoid their predators. Newfoundland cod fishermen noted that with the increase in the harp seal population, they had to fish cod in depths below 40 fathoms. Seals, however, are not inhibited by depth and will forage along the bottom.

Comment: The suggestion was also made that there might be more herring on the offshore banks due to the depletion of predators such as cod.

Comment: The effect of large seal populations on herring spawning behaviour was raised. In the late 1990s, when the roe fishery began off the Eastern Shore of Nova Scotia, there were fewer seals and the fishing was done at night. Now there are many more seals and herring and the herring do not seem to spawn until close to daylight when the seals settle on the rocks along the shore.

SW New Brunswick Weirs and Shut-offs

Working Paper: Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2006. 2006 Evaluation of 4VWX Herring. RAP Working Paper 2006/05.

Summary of Presentation:

There was a decrease in landings in the traditional New Brunswick weir and shutoff juvenile herring fishery from 20,700t in 2004 to 12,639t in 2005. The weir fishery in the Grand Manan area was particularly poor.

Comments and Questions on the Working Paper:

The low catches by weirs in the Grand Manan area were noted and observations about the low number of fish in the area were discussed. The Strathaven, a herring carrier, has been outfitted with acoustic gear and it was hoped that surveys could be conducted around the weirs, but in 2005 there were so few fish that the surveying was limited. Researchers from the University of New Brunswick reported that seabird chicks on Machias Seal Island were starving to death because of a lack of brit. There are also hardly any inshore catches from Maine.

Additional Comments

It was noted by several industry representatives that more money is required for Science. It was requested that the following recommendation be placed in the minutes:

Industry Recommendation: More money is drastically required for science on fish stocks and oceans. This is not an appropriate time to cut back on Science.

RAP SCIENTIFIC PEER REVIEW OF4VWX HERRING

The meeting commenced at 9 a.m., April 11th, with the Chair, Dr. W. Stobo, welcoming participants. After introductions, a sign-up sheet was distributed (see Appendix 2 for the list of participants). The Chair reviewed the Meeting Agenda (Appendix 4), the Remit (Appendix 6) and identified the working paper that was to be reviewed at the meeting (WP 2005/05b). It was explained that the purpose of the meeting was to advise on stock status and related issues, not allocation. He explained that the information that had already been reviewed at the Data Input Meeting in Yarmouth on March 22nd, would not be reviewed again and that there would be no discussion of the Coastal, Offshore Scotian Shelf and New Brunswick Weir fisheries except in relation to the SAR. He indicated that copies of the draft proceedings from the March 22nd Data Input Meeting were provided on the side table and that any comments or changes should be directed to Kirsten Clark. The reviewers, Kent Smedbol and Claude LeBlanc, were introduced. The rapporteur was K. Clark.

Working Paper: Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, R.L. Stephenson, and S. Gavaris. 2006. 2006 Evaluation of 4VWX Herring with Preliminary VPA. RAP Working Paper 2006/05b.

Summary of Presentation:

Two VPA models were presented. Model 1 included the overall acoustic survey index (Scots Bay, Trinity Ledge, Spectacle Buoy, German Bank) and is the same as last year, and the second model included only the acoustic index for German Bank for ages 4 to 8.

Questions of Clarification:

Question: What is considered an acceptable standard error? In figure 37 on page 23 of the working paper, the standard errors seem high.
Response: They are high. Standard errors between 30 and 50% are reasonable.

Question: What produces the large errors?
Response: There can be errors in the acoustic estimate, the catch at age and the estimates of M (natural mortality), for example
Comment: It is hard for non-scientists to comment on the VPA but the high error stands out. Despite the big standard errors, concrete numbers are produced at the end.

Question: In the VPA presented this year, only ages 4-8 are used because of the high standard errors. Does this allow us to directly compare with last year's VPA which included other ages?
Response: The model simulates what would happen to those ages in previous years so it is comparable year to year.

Questions from the Reviewers:

First Reviewer: Claude LeBlanc, Gulf Region Fisheries Centre

Question: Why was Scots Bay not used in the index for the VPA since in some years, a third of the catch comes from this area?
Response: Scots Bay was not used because of the extreme decline in the 2005 biomass estimate. We were not totally confident that the estimate covered the entire

spawning period because of problems with survey spacing. Taking this into consideration, the index was run for just German Bank alone.

Question: How will you account for this in future years?
Response: There might be a gap, or we'll use a mean value depending on what seems appropriate in the future.

Comment: Table 29 is incomplete in the working paper.
Response: It is completed in the draft SAR.

Comment: Fishing mortality is very high and none of the conservation objectives have been met in 2005. This looks like a danger sign and indicates that caution is necessary.

Second Reviewer: Kent Smedbol, St. Andrews Biological Station

Question: Can you elaborate on the full positive residual patterns in 2005? What does it mean if for every year class the age estimates are positive?
Response: It means the survey was higher than expected compared to the population in 2005 (see page 25 of the working paper).

Comment: The retrospective plots bounce back and forth across the line which means that while there is error, it is both plus and minus and so the model is in right ball park

Question: In the age by age plots why is age 4 such a horrible fit? Is it driven by the fishery or is it because age 4 is more dominant in the fishery than expected.
Response: It is the dominant year class. If it is extremely abundant it may have an effect of the relationship. The fits were decent for other ages.

Comment: Looking at the summary of the VPA output, every signal one would look for in the assessment is red. There is no positive sign from any of the inputs for this meeting.

The meeting was then opened to questions from the other participants.

Questions and Comments:

Question: In relation to Table 9 on page 4 of the working paper, there was a decline in the acoustic estimate for Scots this year but this has happened before. In 1999 there was a dismal result and then in 2000 the estimate went up. For German Bank in 2001 there was a poor result and then the estimate went back up. Why would this happen? Why would we see such a huge decline on both German and Scots?
Response: In Scots Bay there were issues of survey timing and missing fish. In 2001 with the low value on German we included a large catch on Spec Buoy and considered that the spawning fish might have moved a bit. This year the survey design on German was followed to the letter and the results on German show a significant and real decline. The results from Scots could be debatable with some of the survey issues, which is why we presented a VPA model with German Bank data only.

Question: You don't use the age 3s in the VPA because of the high standard error, can half the age 3s be put in the model?
Response: The model does assume 50% recruitment for age 3 in the calculation of SSB.

Question: Would there be a change to the results if you included the age 3s as input?
Response: It wouldn't change anything except to make the overall fit poorer.

Question: An explanation of how the retrospective patterns in Figure 59 on page 36 was requested.
Response: The retrospective shows what happens if you remove one year's data, and then two year's data etc.

Question: What makes the difference between using 2005 data and not using it?
Response: The acoustic numbers are driving it down.

Question: An explanation of the exploitation pattern in Table 23 on page 9 was requested.
Response: The PR or partial recruitment represents the proportion of the fish that are vulnerable to the fishery. In Table 23, 0.9 means that 90% are vulnerable to the fishery.

Question: Why are some of the values in the table greater than 1?
Response: It is because of the averaging.

Suggestion from the Chair: Outside the RAP process, if you want to have a better understanding of the models, it would be a good idea to have sessions dealing with how a VPA works.
Comment: VPA has become front and centre and industry representatives feel they are not up to speed and yet the results are very troubling and have to be dealt with now. Not understanding how the model functions is a real disadvantage.
Response from the Chair: This is not something that can be resolved at this meeting. The VPA is a standard procedure used in groundfish and herring assessments since the 1970s. It is well accepted in fisheries biology and most are familiar with it.

Comment: The VPA is driven by us being able to determine the total amount that we can catch, but it doesn't deal with fish moving in and out of our current stock structure. We may believe all six year old fish are available to us, but if they aren't it will have an impact on the VPA.
Response: The general outcome of the model is being driven by the fact that the survey and the fishery are not catching older fish. Fiddling with the model and changing the parameters slightly isn't going to change this – there is still a low SSB and high mortality. For the model to fit the age structure and drop in the acoustic surveys, it has to assume that the fish have died. For age 6, it doesn't matter what their PR is, if they aren't there. Most of the major indicators are alarming in this stock at the moment.

Comment: The number of older fish in the catch has been low for a number of years. What is new this year, is that the estimate of SSB has decreased from half a million tons to a tiny fraction of this.

Question: If last year's acoustic survey estimate was also low, how would that have changed the bigger picture?
Response: There would be a similar decline.

Question: Last year's VPA overestimated the stock with high acoustic estimates. Is it possible that this year the VPA is underestimating the stock because of low acoustic estimates?

Response: It would just be fine tuning. There are other things that still look bad. In the past we have over rather than underestimated. It is possible to go either way.

Question: In reference to figure 55, page 34 of the working paper, last year the 2004 fishing mortality estimate looked good in the assessment. This year the figure shows rapidly increasing fishing mortality in previous years and a rapid decline in 2005. Essentially it is the same thing that was said last year for 2004, and now it is no longer the case because of over-estimating the stock. Fishing mortality was underestimated last year. This throws into question the validity of last year's model and therefore this year's model. Do we really have F dropping from 2.2 to 0.6?

Response: A major reason for the decline is the TAC reduction in 2005.

Question: In reference to figure 36, page 22 of the working paper. If the PR is below the average for the past 10 years, is it a good thing or bad thing?

Response: It only effects the bottom corner of the matrix. Changing the PR by 0.1 or 0.2 is going to have a minimal effect on the population numbers estimated. The recent 5 year and 10 year average for PR by age is below the long term average meaning that they are less available at those ages. Perhaps this is something for the framework assessment. Perhaps the PR for ages 2, 3 and 4 needs to be modified. As to whether it is good or bad to be below the average line, if you use a lower PR value you create slightly larger numbers in the population. It is better for overall population size to have low PR but it doesn't make a big difference.

Question: If you used a VPA last year which incorporated all ages and you used a different one this year, which incorporates only some of the ages, how can you compare from year to year?

Response: The model incorporates all data, including data from previous years. You can look at this year's model to compare to previous years.

Comment: In 2004, a lot of 1 and 2 year olds were caught, but in 2005 they weren't. It was considered a negative thing last year and the TAC was lowered partly because we were catching juveniles. This year it is a positive feature in the fishery that juveniles were not targeted.

Comment: In 2005 there was a low catch because of a low TAC and industry avoided small fish. We need to give it a chance to continue to see how that low TAC is going to make the change over time in the age composition.

Response: It has always been said that it would take a number of years of fishing at low levels to see a rebounding of the stock. We don't have a good estimate of age 1's, but currently that year-class does not look good.

Comment: There are problems with the acoustic estimate from Scots Bay. It is also hard to fathom how you can lose 250,000 t of fish from German Bank in a single year with a low TAC. Industry representatives feel that the surveys did not include all the herring since the deck sheets from the surveys were not included in the biomass estimate even when they recorded large bodies of fish that weren't

observed by boats with acoustic systems. In the Gulf Region, they use the verbal information that the harvesters give them.

Response: In the Gulf Region, a telephone survey is used to get information like the number of nets fished. If a decline in SSB is seen by Science, the information from this survey is used as a confirmation of the result – i.e. is this decline seen by the fishermen? It is not used to determine the SSB.

Response: The difference of 250,000t between the 2004 and 2005 acoustic estimate might be because the 2004 number was an overestimate, it might not be that we have "lost" 250,000t of fish. The tagging study showed longer residency time on the spawning grounds allowing for double counting so it may have been an overestimate last year, rather than a huge decline.

Comment: In Table 9, page 4 of the working paper, there were sharp declines in the past and then the following year the estimates went back up again.

Response: One of the reasons for only using the German Bank acoustic index in the VPA was that concern was expressed at the Yarmouth Data Input Meeting about the estimates from Scots Bay. The Scots Bay information was excluded this year, since the decline on German Bank was not as dramatic.

Comment: The decline results from just 3 surveys and in previous years we had 4 or 5. Low results may also be a result of low numbers of surveys. The reasons for the lower numbers of surveys in Scots Bay were stated earlier. During the surveys that did occur there was good coverage of the survey area and the protocol was adhered to, but in Scots Bay and, to a lesser extent, on German Bank there was not good temperal coverage – not as many surveys were done.

Comment from the Chair: This will be noted in the proceedings and the industry perspective portion of the SAR and it relates to what we should be doing in future years.

Response: It will certainly be mentioned because it is a critical reason for picking the German survey only.

Comment: If Scots is not included in the VPA because of the major reduction in surveyed biomass, then surely the similar major reduction on German from 367,000t to 211,000t in 2005 should also be considered. There is a precedent from 2001 when there was a low estimate on German Bank and then the following year the estimate was back up to the "normal" level.

Response: The index in previous years may be a real overestimate because more surveys were added together. With lower numbers of surveys, there was less to add together.

Question: What are the VPA age plots (Figure 43, page 27)?

Response: Outputs of the model. The figure shows the log value of survey observations for that age versus what the model predicts for that age.

Question: Why is the relationship so poor?

Response: What the acoustics are picking up there is so variable that it is hard to get a fit. Question: Can you check to make sure that the 2002 point is in Figure 43 and label the axes properly.

Action Item: Make sure the 2002 point is in Figure 43 in the working paper and correct the axes labels.

Comment: In relation to Table 29 on page 15 of the working paper, up to this point we have been concentrating on the VPA and some problems with the acoustic estimates from Scots Bay. We need to discuss the other indicators. Is the temporal and

spatial distribution contracting? What about the lack of older ages or spawning? These observations outside the VPA are very important.

Response: Even if the SSB were doubled, the fishery would still be nowhere near meeting the target F. Even if you rejected the VPA and fell back on other data, the outlook is still very pessimistic. The conclusion isn't being driven by the VPA it is being supported.

Comment: Since 1995 the trend in the biomass has been around 200,000t (page 33, figure 54 of the working paper). The trend in the VPA is fairly flat with a decline in recent years which is what we've seen with the acoustics.

Comment: Twenty years ago the fishery still supported itself with much higher landings. The bottom trawl surveys are catching more, other things are changing. We are missing some pieces of the picture. The fish change and you can see this in the historical data in Table 3. Perhaps the fish are elsewhere.

Response: If the fish are elsewhere then TAC should still be reduced because they're not there to be caught.

Comment from the Chair: In the 4W winter herring fishery either the fish moved elsewhere or were destroyed. We could be approaching a similar situation here.

Comment: There are lots of ups and down over time. The Chebucto Head herring are not there any more but we didn't catch them all. There are changes in the environment and these need to be taken into account.

Response: You certainly can't discount it, but how do you build it in as an adjustment factor?

Question: Where is the recruitment at age 1 derived from?

Response: The VPA, Table 27 in the working paper.

Question: The VPA is dependent on catch data. If we had set a higher TAC and had higher catches, would that mean that the model would tell us that things were better?

Response: It would be reflected in the population numbers. We also know that there are problems based on other key indicators such as the truncated age distribution.

Question: If we have low catches, how will the VPA tell us that things have improved?

Response: There would be other indicators that would show that things were better like a broader age contribution which would give you lower fishing mortalities and would therefore produce an increase in population in the model.

DRAFT SCIENCE ADVISORY REPORT (SAR) DISCUSSION

Context Section:

- In the second paragraph add "outside of the spawning period" at the end of the phrase "...and there is mixing of fish among spawning components" since it is intended to mean that they mix at times other than spawning.

Comment: When the framework assessment is mentioned there should be an explanation of why a framework assessment is needed.

Response: Framework assessments occur periodically for all the stocks. The terms of reference include many issues.

Comment: One of the major things that will be examined at the framework is the acoustics and the VPA presumably. Industry representatives want to be intimately involved in setting up the framework process, including having some input into who the

participants will be. If money is an issue when external reviewers are being considered, then industry might be able to help to make sure that we have good participation and review.

Response: It would be the intent to fully include industry. Bob O'Boyle of the RAP Office would be the contact person for further details and information.

Comment: At the information session scheduled after the 2005 4VWX Herring RAP, we talked about bringing in certain people, but because of a lack of funding we didn't end up with as broad a group of people as hoped. Industry representatives want to avoid that happening again. When will organizing process for the framework assessment start?

Response: Once the current RAP and 5Z Herring TRAC are over the draft terms of reference will be produced. There is a tentative plan for at least two meetings. One meeting will be devoted to acoustics. The meetings cannot be held during September when the fishery is very active, so the first one will probably be scheduled for the end of October and the second for sometime in the winter.

Background Section:

Species Biology:

- The word "predictable" should be removed since overwintering behaviour is not predictable

Rationale for Assessment:

- The word "final" should be removed from the phrase "for establishing the final quota" in the first paragraph.

Assessment for SWNS/ BOF Spawning Component:

The Fishery:

Comment: This should be worded clearly since we don't want people to think we couldn't catch 50,000t. The total catch is below the TAC due to a lag time with transfer of quota.

Response: This will be explained in the Res. Doc.

- Last line of the fishery section change "other components" to "non-stock components".
- There was objections used to the use of the word "dominated" for age 4 in last paragraph of page 3 of the SAR. Industry respresentatives indicated that they tried to restrict the catches of young ages. The word dominated should be removed
- Add a final sentence saying that "As a result of the concerns that were expressed in 2004 that 2 year olds were being targeted, industry attempted to re-direct effort to catching older fish. In 2005 2 year olds represented only 16% of the catch, a reduction from 32%"

Comment: The decrease in small fish in the catch has to be seen as a positive thing in the rebuilding of the stock. It is important to note that even though we have a problem with a lack of older age fish, we have shifted from fishing the younger fish.

Question: Were the lower catches of small fish a result of a change in fishing or an indication of weaker year classes?

Response from Industry: Industry put caps on the amount of small fish landed and managed this internally.
Comment: Figure 33 in the working paper shows that 2003 might be a weaker year class.
Response from Industry: Last year, we made the reverse argument, that the reason we were catching so many small fish was that they were strong year classes, but that argument was rejected.

- In the first paragraph on page 4, "Age range remained contracted....", the word "range" will be replaced with "distribution". It was noted that this is one of the more alarming signals in this stock and must not be dropped from the SAR. An additional sentence was suggested stating "However there has been a decline in the percentage of age 2's and an increase in the percentage of age 4's in the catch".
- In relation to Figure 3, there was a request to include the age 2's, 3's and 4's. An additional 3 figures were drawn up and it was decided that they should all be included in the SAR with the following reference to them in the text "However, there has been a decline in the percentage of age 2's and an increase in the percentage of age 4's in the catch in 2005".

Acoustic Surveys:

- In the first paragraph at the bottom of page 4 "were conducted every 2 to 3 weeks" will replace "approximately 2 week intervals"
- In the first paragraph on page 5 add "a reduction of one in each location from the previous year" to the first sentence.
- In the first paragraph on page 5 the second sentence should be changed from "Survey coverage was good" to "Individual survey area coverage was good and consistent with established survey protocol".
- The zeros in Table 2 for 2004 and 2005 indicate that there were attempts to do acoustic surveys on Spectacle Buoy but no fish were seen. No survey was done in 2004 so the zero should be changed to a blank. Very few fish were seen at Spectacle Buoy in 2005 so the amount rounds to a zero. "Blank or no entry indicates no survey" will be added to the caption and a value of 0.3 will be put in for Spectacle Buoy for 2005.

Action Item: Check that all blanks in Table 2 indicate that no survey was done.

Population Model:

Paragraph One
- "The 1999 to 2003 acoustic survey results were used as the estimates of SSB for those years; commencing in 2004 they have been used as an index. Approximately 500kt SSB was estimated annually from 1999 to 2004. An SSB of about 500kt since the late 1990s would have been expected to result in substantial growth of the population, improved age composition, and low fishing mortality, given reasonable recruitment and the landings of recent years. The expected growth in the population and increase in proportion of older fish were not observed in the surveys or the fishery."

Paragraph Two
- There was disagreement about the first sentence, since all participants do not agree that the surveys are an overestimate. It was agreed that the paragraph would begin with "A preliminary tagging study showed..." and that reference should be made to the recommendation that the tagging work be repeated and to the fact that this issue will be

addressed at the framework meeting. The paragraph should be redrafted to indicate that there was a tagging study, it had certain implications and requires further investigation.

Paragraph Four

- Include: "Further any benefits of the lower landings would not yet be reflected in population response. " at the end of the paragraph. Add in that the estimated SSB is at the lowest level.

Figure 5

- Indicate in the caption that Total Biomass is 1+ and SSB is half the age 3's and above.
- Remove "ages 4-8" from the caption.

The Chair halted proceedings for the day, indicating that the meeting would recommence on Wednesday, April 12 at 9 a.m.

Wednesday, April 12th

Participants were welcomed back to the 4VWX Herring RAP, and the meeting recommenced.

Section of the SAR on the Population Model (VPA) continued:

Paragaraph One:

- The first sentence will now read "Between 1999 and 2003 acoustic survey results were used as estimates of absolute SSB abundance and the population was considered to be approximately 500kt"

Paragraph Two:

- There was considerable discussion about this paragraph and the conclusions that are made. It was noted that the single best survey on each of the spawning grounds shows more fish than is estimated by the VPA. By using the single best survey the issue of turnover is avoided, so the only factors that can account for this difference are things like target strength. In response it was noted that the trend shown by acoustic survey index matches the trend in the VPA, although it does not match as an absolute sum of surveys. Part of the discrepancy between the acoustic survey and the VPA is due to the fact that the VPA is dominated by the catch at age and therefore has to account for the lack of older fish. This lack of older fish in the population results from one of two possibilities: either all the fish leave or they are all killed. To account for this the model has to calculate a very high fishing mortality. The acoustic survey is not driving that model outcome. It is driven by the very poor catch at age. The outcome would still be bad even if the acoustic survey index didn't show a dramatic decline.
- A revised second paragraph was produced and approved: "The previous assessment (2005) concluded that the SSB from acoustic surveys summed together results in an overestimate but that as an index of abundance acoustic surveys follow the biomass trend. While the discrepancy between the acoustic estimate of absolute SSB abundance and the VPA has not been resolved, there are several potential explanations. A tagging study undertaken in 2005 on both German Bank and Scots Bay confirmed that resident time of a portion of the fish on the spawning grounds may exceed the assumed two week turnover interval. However, adjustments to the acoustic biomass estimates, based on preliminary analysis of the tagging data from Scots Bay, appear to only account for about 40% of the difference between VPA and acoustic estimates. Biomass estimates from single acoustic surveys exceeded total VPA results for the series. Hence the difference is not fully explained by possible double counting by the acoustic surveys, but could also

relate to other issues including unaccounted mortality and an inappropriate target strength coefficient for converting backscatter to biomass".

Paragraph Three
- In the first sentence "indicates a declining" was changed to "indicates a decline".

Paragraph Four
- Paragraph rewritten as follows: "The VPA calibrated with the German Bank acoustic index only was selected to overcome uncertainty with survey timing in Scots. The VPA indicates that F has been very high in recent years and the current SSB is less than 100kt (Figures 6 and 7). The reduced quota in 2005 resulted in a lowering of fishing mortality but it is still high relative to $F_{0.1}$. The benefits of the reduced quota are reflected in the reduced fishing mortality rate for 2005 but the adjustments have not been in place for a sufficient period to be reflected in the biological characteristics of the fishery".

Conclusions and Advice:

The table documenting the objectives for this stock from the management plan versus the current observations was discussed. It was noted that none of the conservation objectives are being met.
- Under the objective, "Maintain biomass of each spawning component", the sentence will be changed to "Substantial decline in the acoustic index from 2004".
- Under the objective, "Maintain broad age composition", the sentence "Targeting of small fish was not a major issue in 2005" will be changed to "Targeting was reduced in 2005".
- It was stated that this assessment has confirmed a continued deterioration in the state of the resource as noted in previous assessments. A harvest strategy that allows rapid population rebuilding is strongly recommended. Projection results and risk analysis are provided in terms of the consequences of various catch quotas (yield)(Figure 8 in the SAR). Catches of less than about 16,000t would be required to have a low to neutral risk or probability of exceeding $F_{0.1}$. Assuming average recruitment and PR, catches as high as 35,000t should result in a neutral (50%) chance of a moderate (20%) biomass increase.
- There was considerable discussion of the risk plot and potential scenarios. Industry representatives requested that the implications of leaving the TAC at 50,000t be included in the text. The following sentence is to be added to the second paragraph: "At status quo catches of 50kt there is a neutral probability of a biomass change, but a high probability that there will not be a moderate (20%) biomass increase."

Other Considerations:

Paragraph One:
- "The benefits of the reduced quota in 2005 have not been in place for a sufficient time to be reflected in the biological characteristics of the fishery. Industry took action to avoid young fish in 2005 and the fraction of two year olds in the catch was reduced substantially."
- Move the following to the fisheries section of the SAR: "Prior to 2005 there has been targeting of young fish, and the high proportion of juveniles in the catch resulted in reduced yield. The total removals of fish by number were reduced by close to 50%"

Paragraph Two:
- Remove the second sentence beginning "The acoustic index provides...." and replace it with "The acoustic index provides independent information on spawning stock biomass

primarily but does not provide information on younger year classes. Younger ages are estimated from the VPA and are subject to significant variation from year to year"

Sources of Uncertainty:

The following sources of uncertainty were listed:

- Scots Bay surveys did not cover the entire spawning season
- There is no independent index of recruitment and a large fraction of the catch is dependent on recruiting year classes.
- There is uncertainty related to residency time on the spawning grounds. Tagging conducted in Scots Bay and German Bank indicated that some tagged fish remain on the spawning grounds for a longer period than the interval between surveys.
- Industry observed that herring remained close to bottom in 2005, which may have had an impact on the estimation of biomass from acoustic surveys.
- There has been variation in the number of surveys conducted on German Bank and in Scots Bay over the time series
- The absolute abundance calculated from the acoustic surveys was consistently higher than the VPA estimates of biomass.
- Target strength conversion to biomass is a point of uncertainty and more work is required on the estimation.
- The integration factor is a source of uncertainty, since the methodology of the calibration was changed in 2003. This has to be reworked in order to produce a consistent time series.
- There was uncertainty associated with the level of noise in the acoustic data collected some acoustic transects related to individual vessels.

Comment: Herring in the spawning areas stay tight to bottom most of the night, and are only up in the water column for a couple of hours. They cannot be surveyed when close to bottom and are easily missed.

Comment: Anecdotal observations from the fishermen, especially on German Bank, are inconsistent with the conclusions of the assessment. They feel that they saw more fish in 2005 than in 2004, but the numbers don't reflect that. This was raised at the Yarmouth meeting and noted in the proceedings.

Response: The working paper that reports fleet activity is supposed to capture this information. Documentation is required for the information to be considered. A telephone survey was suggested or clear documentation in the fleet activity report produced by the Herring Science Council.

Offshore Scotian Shelf:

- On the figure showing the bottom trawl survey results, the numbers from the Teleost will be displayed as points and will not be connected to the rest of the series.

Coastal NS:

Question: Was the Eastern Shore Survey that was brought up at the Yarmouth meeting examined?

Response: Yes, but the estimate from this survey was lower and so it was not included in the final estimate.

NB Migrant:

- Change the last sentence from "there has been a trend of decreasing landings" to "there has been a trend of decreasing number of weirs in the fishery and decreasing landings".

Sources of Information:

- Reference to the tagging document and other research documents should be included.

CLOSING

The Chair explained the procedure for the completion of the SAR. A draft of the SAR will be circulated for final editorial comments and then will be submitted to an editorial board. Draft bullets for the beginning of the SAR will be sent to all participants for approval. The contents of the SAR are to be considered confidential until approved by the minister.

The Chair then thanked all the participants and declared the meeting closed.

[The Proceedings were subsequently adopted by correspondence (Appendix 8).

Appendix 1. List of Participants in RAP Data Input Meeting of 4VWX Herring.

Participant/ Participant	Affiliation/Affiliation	Address/Adresse	Telephone/Fax Téléphone/télécopieur	E-mail / Courriel
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Snow, Ken	Guysborough Co. Inshore Fishermen's Assoc.	P.O. Box 98, Canso, NS B0H 1H0	(902) 366-2266	gcifa@ns.sympatico.ca
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Stevens, Darren	Eastern Shore Fishermen's Protective Assoc.		(902) 845-2969	esfpa@accesswave.ca
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Appendix 2. List of Participants in RAP Scientific Peer Review of 4VWX Herring.

Participant/ Participant	Affiliation/Affiliation	Address/Adresse	Telephone/Fax Telephone/télécopieur	E-mail / Courriel
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Stanwood, Billy	Little Hope Management Board	6 Placid Court, Yarmouth, NS B5A 4N5	(902) 742-0977	Billy.nicole@ns.sympatico.ca
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Stewart, Dick	Atlantic Herring Co-op	Box 517, Yarmouth, NS B5A 4B4	(902) 742-9101	aherring@ns.aliantzinc.ca
Stirling, Roger	Seafood Producers Assoc. of NS	Box 991, Dartmouth, NS B2Y 3Z6	(902) 463-7790	spans@ns.sympatico.ca
Stobo, Wayne	DFO/MPO, BIO	1 Challenger Drive, Dartmouth, NS B2Y 4A2	(902) 426-3316	stobow@mar.dfo-mpo.gc.ca

Appendix 3. Letter of Invitation

Fisheries and Oceans Canada / Pêches et Océans Canada

20 February 2006

Distribution:

Subject: **Invitation to Maritimes Region RAP Herring Meetings: Spring 2006**

The 2006 Maritimes Regional Advisory Process (RAP) for herring stocks in NAFO divisions 4VWX in the Bay of Fundy/southwest Nova Scotia and on the Scotian Shelf, including coastal areas, will be split into two sessions: RAP Data Input Meeting (March 22) and RAP Scientific Peer Review (April 11-12, 2006). The remit for the 2006 4VWX Herring RAP is attached.

The intention of having two meetings is to (1) strengthen the Data Input review aspect of the RAP process, and (2) ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The Data Input review is about 3 weeks before the Scientific Peer review: late enough to allow time to have the data inputs ready, but early enough so there is sufficient time before the Peer Review meeting to incorporate the feedback from the Data Input Meeting and to prepare the complete assessment document including the VPA. Therefore the VPA will not be available at the Data Input Meeting. The final goal of the two RAP sessions is to develop stock status conclusions and advice, and complete the Science Advisory Report (SAR).

Presentation and discussion of data inputs to the assessments will occur at the RAP Data Input Meeting (22 March 2006, Yarmouth). Presentation and discussion of the outcome from this first meeting, the subsequent analyses conducted, and the formulation of the "Conclusions and Advice" portion of the Science Advisory Report will occur during the 2-day RAP Scientific Peer Review meeting (BIO Auditorium, Dartmouth, NS).

The meeting agendas are attached. Please note, sessions will start on time, and the timing on the agendas will be adhered to as closely as possible. When the documents are available they can be accessed on the RAP website; an announcement with further instructions will be sent out closer to the meeting date.

If you plan to accept this invitation, please inform Michele Saunders (ph: 506-529-5835; fax: 506-529-5862 or e-mail: saundersme@mar.dfo-mpo.gc.ca) at your earliest convenience.

Yours sincerely,

Original signed by

Wayne Stobo, Chairman

Population Ecology Division
(Tel: 902-426-3316)
(Fax: 902-425-1506)

Attachments

Bedford Institute of Oceanography
P.O. Box 1006
Dartmouth, Nova Scotia
B2Y 4A2

Canada

Appendix 4. Agenda RAP Data Input Meeting

Maritimes Provinces Regional Advisory Process: 4VWX Herring Stocks Data Input Review Meeting

22 March 2006

AGENDA

Background

The intention of having two RAP sessions is to (1) strengthen the Data Input Review aspect of the RAP process, and (2) ensure that the RAP Scientific Peer Review Meeting concentrates on the scientific peer review and interpretation of the information. The Data Input Review is about 3 weeks before the Scientific Peer review: late enough to allow time to have the data inputs ready, but early enough so there is sufficient time before the Peer Review Meeting to incorporate the feedback from the Data Input Meeting and to prepare the complete assessment document including the VPA. Therefore the VPA will not be available at the Data Input Meeting.

2006 RAP Data Input Meeting will be chaired by the 2006 Herring RAP Chair (Dr. Wayne Stobo).

Herring RAP Data Input Review

Date: 22 March 2006 (Wednesday)
Time: 0900-1630 (with health breaks, lunch on your own)
Place: Yarmouth, N.S., Rodd Grand Hotel

The meeting will follow the format below:

The focus of the spring 2006 herring RAP will be on the components indicated below:

- SW Nova Scotia/Bay of Fundy spawning component
- Offshore Scotian Shelf banks spawning component
- Coastal (South Shore, Eastern Shore and Cape Breton) Nova Scotia spawning component
- SW New Brunswick migrant juveniles fishery component

1. Introduction
2. For each stock component and where applicable:
   - Description of the fishery
   - Sampling and catch-at-age
   - Abundance indices including acoustic and other survey results
   - Tagging experiments, movements and results
   - Questions of clarification
3. General discussion
4. Close

Appendix 5. Agenda RAP Scientific Peer Review.

Maritimes Provinces Regional Advisory Process: 4VWX Herring Stocks

Scientific Peer Review

11-12 April 2006
Auditorium, Bedford Institute of Oceanography, Dartmouth, NS

AGENDA[1]

11 April – Tuesday

0900 - 0930	Welcome and Introduction
0930 - 1200	4VWX Herring assessment
1200 - 1300	Lunch
1500 - 1700	4VWX Herring assessment

12 April – Wednesday

0900 - 1200	Review of 4VWX Science Advisory Report
1230 - 1315	Lunch
1300 – 1600	Review of 4VWX Science Advisory Report (if required)
1600	Adjournment

[1] **Health breaks** will be provided mid-morning and mid-afternoon.

Appendix 6. Remit.

Science Advisory Process on Assessment of 4VWX Herring

Data Inputs	Assessment
22 March 2006	11 – 12 April 2006
Yarmouth, NS	BIO Auditorium, Dartmouth, NS

REMIT

Context

Every winter, Maritimes DFO Fisheries and Aquaculture Management (FAM) requests Science to undertake an assessment of the 4VWX herring management unit in support of the upcoming fishery. In previous years, the review has been conducted jointly with DFO Gulf Region on 4T herring. This is the first review to be undertaken separately from that of 4T. As well, the review has previously occurred in one meeting. The current review is split into two parts: data inputs, and scientific peer review and interpretation of the information and Science Advisory Report (SAR) drafting.

The intention of having two meetings is to (1) strengthen the Data Input review aspect of the RAP process, and (2) ensure that the RAP Scientific Peer Review meeting concentrates on the scientific peer review and interpretation of the information. The Data Input review is about 3 weeks before the Scientific Peer review: late enough to allow time to have the data inputs ready, but early enough so there is sufficient time before the Peer Review meeting to incorporate the feedback from the Data Input meetings and to prepare the complete assessment document including the VPA. The final goal of the two RAP sessions is to develop stock status conclusions and advice, and complete the Science Advisory Report (SAR).

Presentation and discussion of data inputs to the assessments will occur at the RAP Data Input Review Meetings (22 March 2006, Yarmouth). Presentation and discussion of the outcome from this first meeting, the subsequent analyses conducted, and the formulation of the "Conclusions and Advice" portion of each SAR will occur during the 2-day RAP Scientific Peer Review Meeting (11-12 April 2006 BIO, Dartmouth).

Objectives

Review and evaluate biological and fishery information on 4VWX herring stock status for establishing the final quota for 2005/2006 fisheries, as required in the Integrated Fisheries Management Plan, including:

- An evaluation of the southwest Nova Scotia / Bay of Fundy spawning component
- A compilation and review of information regarding the offshore Scotian Shelf spawning component and the coastal Nova Scotia spawning component
- Update on southwest New Brunswick migrant juvenile fishery component

Working papers will be reviewed on the following:

- 2006 evaluation of the 4VWX herring fishery (part 1: data inputs available for March meeting in Yarmouth; part 2- complete evaluation for April)
- Summary of the 1997-2005 herring acoustic surveys in NAFO areas 4VWX (available for March meeting in Yarmouth)
- Summary and results of 2005 tagging experiments on spawning ground turnover (available for March meeting in Yarmouth)

Outputs

- CSAS Science Advisory Report for 4VWX herring produced by 30 April 2006
- CSAS Proceedings on the discussion at the two meetings (Data Inputs review as an appendix to the Proceedings)
- CSAS Research Documents summarizing the working papers

Participation

The data input and scientific peer review meetings will be chaired by W. Stobo.
The DFO Science assessment team in St. Andrews, NB will prepare the working papers for review
Participation will be invited from the following:

- DFO Gulf Science
- DFO Maritimes Science
- DFO Maritimes FAM
- Herring fishing industry

Appendix 7. List of Documents Tabled and Science Advisory Reports Produced.

Working Papers:

Annis, L.M. 2006. 2005 4WX Herring Fishery: Report of Fleet Activity. RAP Working Paper 2006/06.

Clark, K.J. 2006. An Examination of Turnover Rate of Herring on the Spawning Grounds of Scots Bay and German Bank using Tagging Data. RAP Working Paper 2006/03.

Power, M.J., G.D. Melvin, F.J. Fife, D. Knox, and L. M. Annis. 2006. Summary of the 2005 herring acoustic surveys in NAFO divisions 4VWX. RAP Working Paper 2006/04.

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2006. 2006 Evaluation of 4VWX Herring. RAP Working Paper 2006/05.

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, R.L. Stephenson, and S. Gavaris. 2006. 2006 Evaluation of 4VWX Herring with Preliminary VPA. RAP Working Paper 2006/05b.

Review papers provided for information, but not presented:

2006 Summary of the Weir Herring Tagging Project.

Investigation of the Seasonal Distribution and Abundance of Adult and Juvenile Atlantic Herring in the Fundy Isles Region using an Acoustic System Mounted on a Commercial Herring Carrier.

Science Advisory Report Produced:

DFO, 2006. 2006 Assessment of 4VWX Herring. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2006/ (in prep.).

Appendix 8. Letter of Adoption of Proceedings

Fisheries and Oceans Canada / Pêches et Océans Canada

15 May 2006

Distribution: 2006 Maritimes Herring RAP participants

Subject: Adoption of the Proceedings of the Maritimes Provinces RAP on 4VWX Herring Stocks

On behalf of the Maritimes Region, thank you for your participation in the recent Maritimes Regional Advisory Process for 4VWX herring (March 18, April 11-12, 2006).

Please find attached the draft proceedings of the meeting for adoption by correspondence. **Please advise me of any changes or corrections by 1 June 2006.** Please refer to specific page and line numbers when noting changes or corrections. If I have not received any comment from you by 1 June 2006 that will indicate that you have no changes or corrections to make on the attached draft.

Please do not hesitate to contact me if you require further clarification.

Thank you for your cooperation.

Yours truly,

Julie M. Porter

Julie M. Porter
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Attachment

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